# Minco F2

## Engine Controller User Manual

**GuiLin Minco Electronic CO.,LTD CHINA**
**Add : Building B-216, Venture Park of Returned Scholars,**
**Guilin High-tech Zone, Guangxi , China.**
**Tel/Fax : +86-773-5828281 5812281**
**Website:www.glminco.com**
**E-mail:sales@glminco.com**

# MINCO F2 engine controller operating instruction manual

MINCO F2 engine controller adopts high performance microprocessor and industrial class devices, with high bright LED display and 96 X 96 mm standard machines shell. It has the properties of compact structure, marked display and easyily install, The controller can control the genset to start and stop , detect and measure the work state of genset, and realize the auto-protect function. And it can also provide autostart and ATS control functions.

## I. Characteristic

1. The engine controller control the genset to run or stop by either pass-key, Or outside switch.
2. Provids remote start port, can set the delay start and stop. It can control the the genset to auto start and stop.
3. Acceleration, Deceleration and idle control compatible.
4. Two speed input : frequency or speed sensor
5. There are two kinds connecting ways of Water temperature, oil pressure, option input. That' s analog input or switch alarm input.
6. Auto record the running times of genset.
7. Protection function: low oil pressure, high coolant, overspeed emergency stop and overcrank.

## II. The front-panel function explaination

The front panel of MINCO F2 engine controller have 5 LED, 6 press-keys and 12 indicator lights. The press-keys control genset to start or stop and set working parameters, the indicator lights indicate the state of controller and failure of genset.

### 1. The control key instruction

**RUN**: When press key, the above green light become always bright, indicate controller is be placed in "running", directly start the generator manually , and keep running.

**AUTO**: When press this key, the above yellow light become always bright, indicate controller is be placed in "automatic state", the controller receive the "remote start" switch signal, if this switch is close, then delay to starte the generator; Otherwise will delay to stop machine. To realize the auto-start control of gen-set, "Remote start" switch signal can be provided by the detect module of the normal supply or timer. In order to realize an engine

automation controlling staying.

**RESET**: When press this key, the above red light always bright, indicate controller is be placed in "STOP/RESET" state, if at this time generator just in the running, press this key once the engine will shut down normally.press this key two times continuonsly the engine will stop immediately. [+]、[−]: The key is used to change the LED display content and to change parameter setting under setup circumstances.

**SET**: The key is used to enter into or exit parameter settings.

## 2. Instruction of the indicator light

The front-panel of the controller has 12 indicator lights, they denote the state or alarm of controller and generator.

**Five of them showed LED statement:**

When Press [+]、[−] key, station will be to changed display in 5 LED. They will be displayed the different content, and corresponding every light display the only content.

1) RPM/HZ— Denote genset rotation rate or frequency, concretely still basis that the speed measures way's from the speed sensor or frequency. (Unit: RPM/HZ)

2) TEMP—Denote the current engine coolant temperature. (Unit: ℃ )

3) OIL.P— Denote the current engine oil pressure. (Unit: kpa )

4) BATT.V—Denote the current battery voltage. (Unit: V )

5) HOURS—Denote current already working engine time. (Unit: Hour)

**There is five indicator light of statement:** LOADING, REMOTE, START, AUTO, RESET/STOP.

**The light of alarm:** If MINCO F2 controllers was set to the control ways of ACCeleration and DECeleration, when they starting, the ACCeleration delay or DECeleration delay begin to account at one time, if account haven't examined, but not to detect the ACC eleration limit or DECeleration limit input, t hen the alarm light will be on, but will not lead to shut down the machine for protection.

**The light of fault :** when the engine appear to operation failure ,it will lead the MINCO F2 controller control engine shut down to protect the engine , at the same time, 5 high-light LED denote the failure code . The reason which led to shut down the machine for protecti on can be judged according to the failure code.

Failure code and corresponding failure cause:

E− −01: start failure ; E− −02: emergency stop;

E− −03: over speed; E− −04: loss speed;

E− −05: high coolant; E− −06: low oil pressure;

E− −07: option input failure; E− −08: low battery voltage;

If the machine is conk out, then will lead the machine to shut down for protection, at the same

Time, the malfunction reason will be locked , and the motor can not be start again. until the malfunction was solved, and then pree the key [RESET] . Then you can start the motor again.

### III. Parameter setup

When press [SET] key, the LED will display the "value of option input (default: oil temperature)" firstly. If want to display "fuel level" or other parameters, need to provide the sensor characteristic curve to us, in order to customize and revise in the factory.

When press [SET] key again, it will enter into the setting state, two LED on the left will show "00" - "20" twenty-one in total codes, three LED on the right will show correspon ding parametric content . The parameter will increase or decrease according to pressing the [+] or [−] key. And according to press [SET] key , the set parameter will be saved and display next parameter ( the parameter code add one). Continue to press [SET] key, until all parameters were set, Finally exit parameters setting state. On the setting status, if you do not press anything in the thirty second , the setting state will be exit , and return to the measurement state and to normal display.

00— —coolant temperature upper limit; 01— —oil pressure lower limit;
02— —battery voltage lower limit; 03— —frequency(rotation speed) upper limit;
04— —trip frequency (speed) ; 05— —Freewheel tooth number ;
06— —coolant temperature adjust ; 07— —oil pressure adjust ;
08— —battery voltage adjust ; 09— —delay of pre-fuel ;
10— —delay of ACCeleration (DECeleration);
11— —delay of warm up ; 12— —delay of Energize To Stop (ETS) ;
13— —delay of remote start ; 14— —delay of retransform ;
15— —delay of cool down ; 16 — —delay of Idle speed on starting;
17— —delay of idle speed on stopping; 18 — —control parameter 1 ;
19— —control parameter 2 20 — —control parameter 3 ;

**Coolant temperature upper limit:** If the coolant temperature was selected the analog sensor to give alarm, when coolant temperature exceeds this upper limit, it will lead the engine protection to shut down; (Default:96)

**Oil pressure lower limit :** If oil pressure was selected to give alarm by the oil pressure sensor. when oil pressure is lower than the lower limit, it will lead the engine to shut down for protection; (Default:200)

**Battery voltage lower limit:** When the battery electric voltage is lower than lower limit voltage, it will alarm but will not shut down the engine.(Default:10.5)

**Frequency(rate speed) upper limit:** When the engine frequency (rotation rate) is higher than upper limit, it will lead the engine to shut down for the protection.; and instruct the over speed malfunction;(Default:55)

**Trip frequency (speed):** When the Trip frequency (speed) is higher than upper limit, then, indicate the engine start successfully , and stop striking the motor ;(Default:13.50)

**Oil Pressure lower limit:** If the parameter was set to alarm by oil pressure sensor, it will lead to shutting down the engine for protection if the oil pressure is lower than lower limit.

**Freewheel tooth number:** If the parameter was set to the rotating speed was gained from magnetic sensor nearby the freewheel tooth, this parameter is valid.If the parameter was set to the rotating speed was gained from voltage frequency this parameter will be invalid . (Default:135)

**Coolant temperature adjust , oil pressure adjust , battery voltage adjust:** when you measure the water temperature , oil pressure , battery voltage , it may bring some meas urement error , this error value was allowed to adjust in a range of 10% more or less in MINCO F2. Especially, the coolant or oil-pressure sensor maybe positive modulus (the sensor output enhances with input enhancing) , or may be minus modulus (the sen sor output diminishes with input enhancing) .The effects that arised from imcreasing or decreasing adjusting value will depend on the actual circumstance;

The ways of coolant temperature adjustment: Enter into setting interface, the initializa tion is "0" . Press [+] or [-] once, The current show value will be reduced or added for 2 units. If the screendisplay "4 units were higher" ,please set "+2."

The ways of oil pressure, battery voltage adjustment: Enter into setting interface, the initialization is "0" , Press [+] or [-] once, The current show value will be added or reduced for 2 units. If the screen display "4 units were higher" ,please set "-2."

**Delay of Pre-fuel / Preheat :** Start the delay of Pre-fuel /Preheat before motor starting. At the same time, the Delay of Pre-fuel/Preheat relay became closed. When delay was finished, the relay was disconnect, the motor start . (Default:5)

**Delay of ACCeleration (DECeleration) :** Start the delay of ACCeleration after the engine started successfully. During this time, the ACCeleration relay closed. The Acceleration relay will disconnect

when delay finished. The engine start to work normally. ( Default:20 ) When engine is normal or fail protection shut down, all will start DECeleration delay, time delay period, DECeleration relay to have the output, after the time delay had ended, will the DECeleration relay will disconnect.

**Delay of warm up:** It is between machine group ending successfully and running with load. It will extend the time of providing power with load. In the instance of no hurry-up,

it can make the dynamo group reach to optimal work state, and can availably reduce the abrasion of machine group.(Default:25)

**Delay of Energize To Stop (ETS) :** Only when the system was set to the state of "shut down and stop fuel supply", the delay of stop to provide fuel begin to work. At this time, the output of "provide fuel" is equivalent with the stopping of the machine. While stopping the machine, the relay of "provide fuel" is in the output state, the delay of stop machine and fuel supply begin to work. After above these is over, and the oil pressure is low, the relay of "provide fuel" stop output.(Default:30)

**Delay of remote start :** In the "auto" state of controller, start to delay when the remote switch closed. The engine start when delay finished.(Default:3)

**Delay of retransform:** Start delay of retransform when the engine work with onload and the the remote start switch was disconnected. The engine will dis-onload and empty onload to work when delay of retransform finished.(Default:5)

**Delay of cool down:** When the controller is in "auto" state and the " remote start" switch disconnect, as well as the genset was load-off. The genset will work with empty onload. The genset will be closed after the delay is over. (Default:20)

**Delay of Idle Speed in Starting :** Start to idle speed delay when the machine start succes sfully. Start to ACCeleration when delay finished .(Default:10)

**Delay of Idle Speed in Stopping :** In the AUTO statement, the idle speed delay will begin when the delay of DEC eleration was finished. Fuel stopping when delay finished. (Default:15)

**Control parameter 1:** (Default: 0)

"0" — — engine speed source: genset frequency, fuel mode: Energize To Run (ETR).

"1" — — engine speed source: speed sensor, fuel mode: Energize To Run (ETR).

"2" — — engine speed source: genset frequency, fuel mode: Energize To Stop (ETS).

"3" — — engine speed source: speed sensor, fuel mode: Energize To Stop (ETS).

**Control parameter 2:** (Default: 0)

"0" — —coolant temperature alarm: temp. switch, oil pressure alarm: pressure switch.

"1" — —coolant temperature alarm: temp. sensor, oil pressure alarm: pressure switch.

"2" — —coolant temperature alarm: temp. switch, oil pressure alarm: pressure sensor.

"3" — —coolant temperature alarm: temp. sensor, oil pressure alarm: pressure sensor.

**Control parameter 3:** Only be set by manufacturer, don' t set them by yourself please !

**Notice:**

1) When delay parameter was set "0" ,it may have less than one second delay

2) When the start-up of the machine idle finished, the warm machine delay and the ACCeler ation delay begin at the same time. To ensure the machine sets not onload until working at full tilt ,the delay time of warm up should be more than ACCeleration delay time.

3) If the delay of Acceleration and Deceleration was set the zero, the process of Acceleration and Deceleration will be forbid, At this time,the Acceleration relay have output when the delay of idle speed start. The Deceleration relay have output when the delay of idle speed stop . Connect the Acceleration and Deceleration relay together, then you can link the electronic speed adjusting machine.

4) About the the frequency (rotation speed) upper limit and trip frequency (rotation speed) upper limit, to know it denotes frequency or rotation speed, will depends on the measurement of rotation speed. If changing the measurement of rotation speed, please bear in mind to change these two parameters accordingly and make it correspond to the measure ways of rotation speed;

5) If the the measurement of rotation speed was gained from magnetic sensor,the "frequency (rotation rate) upper limit" indicate that upper limit . At this time, the actual rotation speed upper limit is 10 times of setting value.For example, if rotation speed upper limit was set the value "165" of , the rotation rate upper limit correspondly will be 1650 RPM.

## IV. The controller interface explaination

### 1. Power Supply (range: DC8~36 v)

**Port 1**— —connect battery "+" pole. When the controller works regularly, power supply current is smaller than 300 mA.

**Port 13**— —connect battery "—" pole.

If power source polarity meet on the contrary, since the inside connect have a protecting diode , in general it will not breakdown the controller.

### 2. Speed sensor input: (When the sensor gains a rotation speed from magnetic sensor, it needs to connect an engine )

**Port 14**— —magnetic sensors rotation speed signal input ; The rotation speed wire is a pair of shield wire , another wire connect port "13"

### 3. Analog input:

**Port 15**— —coolant temperature sensor input.

**Port 16**— —oil pressure sensor input

**Port17** — — Monitoring sensor input

### 4. Switch input (That entering adds photoelectricity isolator, the short circuit is effectivewith GND)

**Port 18**— —remote start;

**Port 19**— —emergency stop; (When emergency or repairing the machine, the machine will not start when lock and close this port.)

**Port 20**— —high coolant temperature;

**Port 21**— —low oil pressure;

**Port 22**— —option alarm input;

**Port23**— — ACCeleration Limit input

**Port 24** — —Deceleration Limit input

5. **Relay output** (Relay isolator , touching capacities 2 A/250V)

**Port 2**— —common 1 output ; All of exporting relay have one contact connect the possessions in "comm 1" port except "DEC" relay.

**Port 3**— —start output ;

**Port 4**— —fuel ( fuel / stop ) output ;

**Port 5**— —engine failure output ;

**Port 6**— —pre-fuel (pre-heat) output ;

**Port7**— —genset onload output ;

**Port 8**— —common 2 output ; The "ACC" and "DEC" relay have one contact connect the possessions in "comm 2" .

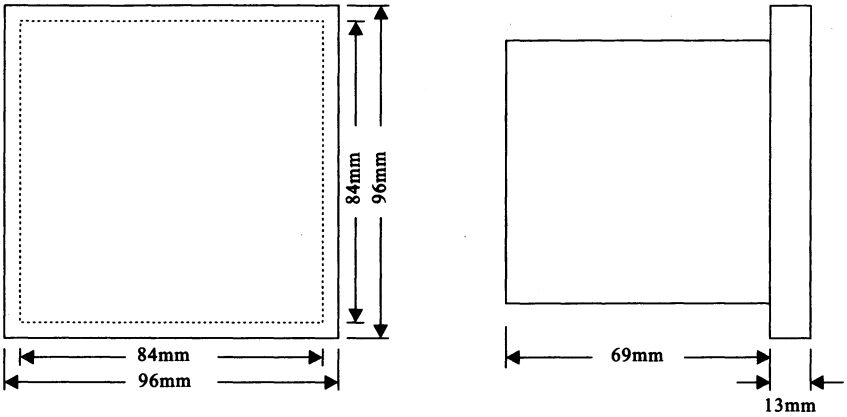
**Port 9**— —ACCeleration output

**Port10** — —DECeleration output ;

6. **Frequency input** (Need connect the engine when frequency gains a rotation speed from voltage , entering voltage range is AC35 ~ 300 V )

**Port 11**、**Port 12**— —frequency input.

## IV. Size of form and outside wiring diagram




Size of form: 96 mm (Width) ×96 mm (Height) ×13 mm (Depth) (front panel)
84 mm (Width) ×84 mm (Height) ×69 mm (Depth) (back shell)
Hole size of panel: 85+1 mm (Width) × 85+1 mm (Height)

## Explanation:

1. When output connects the inductance property load(such as RL), you need to plus the current absorption electric circuit in outside wiring, otherwise it will probably influence the controller to work normally.

2. The input port of "remote start" can also connect with the timer or other devices, to realize time start machine automatically and others.

3. Whether the engine is onload or not will d epends on the "remote start" . If the engine START by pressing START button, the engine will not onload automatically as long as the "remote start" switch input is not closed. Therefore the consumer should pay more attention to this point . if having no need of automation starting engine when applying,only start the engine onload by hand , please bear in mind to short connect GND with "remote start" switch input.

4. All the coolant temperature , oil pressure sensor and alarm sensor that GuiLin MINCO electronic CO.,LTD provides are electric resistance type sensor. For electric resistance type sensor, the measure method needs to connect allotted resistance. The MINCO F2 controller has taken over three allotted resistance already inside, so do not need to connect the allotted resistance outside.

5. If the MINCO F2 controller was set to get the engine rotation speed from voltage, it doesn't need the speed sensor linking; If set to gain a rotation rate from

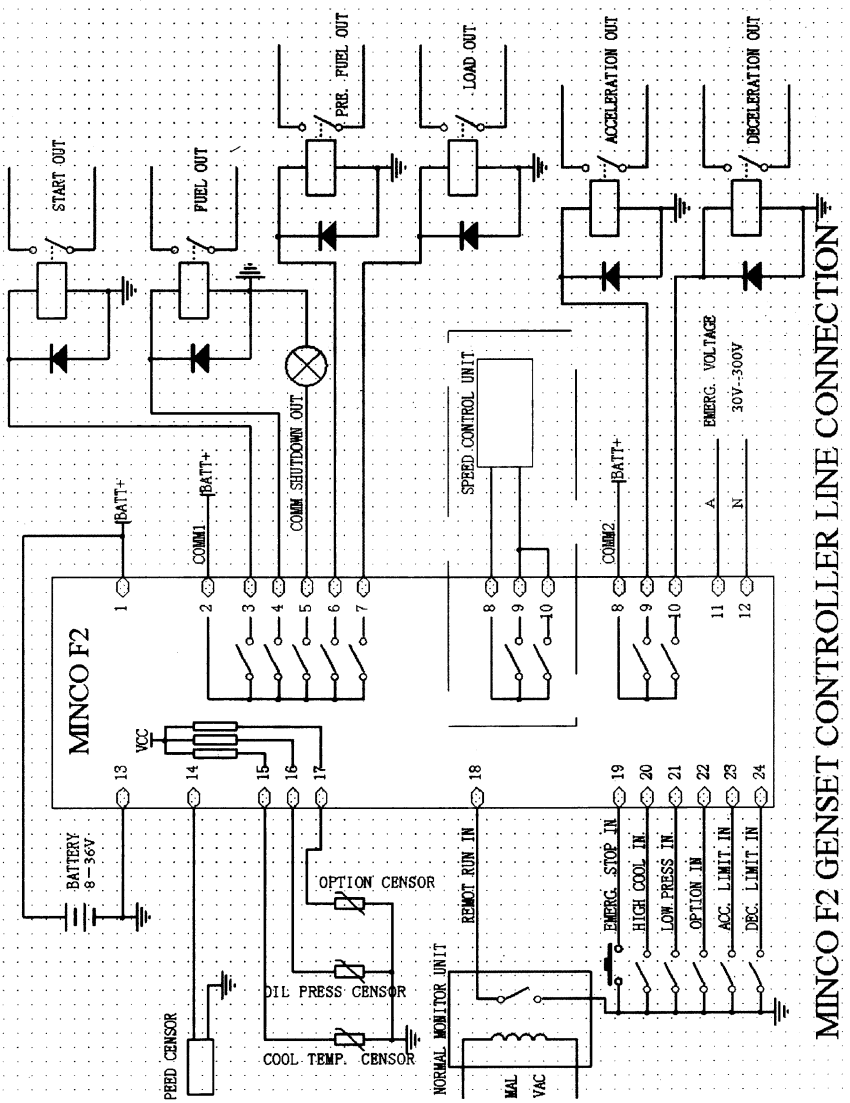
the magnetic sensor , it does not need the voltage input.

6. Acceleration, deceleration of speed control and the idle speed are compatible, if using the idling speed,you must set the delay of Acceleration, the deceleration zero and connct the "ACC" and "DEC" ,then you can connect AVR unit; If chooseing ACC-DEC mode, you must set the needed time of the delay of starting idle and the delay of stopping idle.

7. For ACC-DEC Speed Control, under normal circumstances you need to connect the acc eleration limits in place and deceleration Limit, but in some cases lowerprotection is done in the device without spacing signal to MINCO F2, at this time, MINCO F2 can control ACC-DEC normally, but it will appear "contact failure" Alarm, but it does not affect the genset to work;

**GuiLin Minco Electronic CO.,LTD CHINA**
**Add:** Building B-216, Venture Park of Returned Scholars,
Guilin High-tech Zone, Guangxi , China.
**Tel/Fax:** +86-773-5828281 5812281
**Website:**//www.glminco.com
**E-mail:** sales@glminco.com

Appendix 1 : Outside wiring diagram（Auto start, Auto Transform Switch state）：



Appendix 2 : MINCO F2 front & back panel diagram